

# Significant Factors Affecting Quality and Quality Maximizing Methods of Construction Projects In Outskirt Areas of Afghanistan

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**Abstract :** A project completed according to specific design and including its certain time and plan that called to be ending well project but in general, projects totalize less or outside the pre-planned budget and time because several various factors in the circle of the world all country developing country and developed country via various percentage variance through its predestinated period, On the other hand, that research carried out to study scads significant factors affecting quality and quality improving ways of construction projects in environ region of Afghanistan, on the other word, a questionnaire was expanded according to recognized factors that are obtained according to literature to obtain idea from professionals of construction. The building professionals who have given their responses are consultants/engineers, owners/clients, managers & contractors. The analyses used here are the ranks and Relative Importance Index that has done through the use of Statistical Package for Social Science (SPSS). However, the questionnaire operated and obtained and at the end of this survey analysis top ten effectible factors which affecting quality of construction projects and five main quality improvement methods were identified which will improve the quality. The top ten affecting quality factors are: Corruption during implementation of projects, Security challenge during the implementation of projects, Negligible testing and inspection, Little technical knowledge of Contractors, Material delivered to site with poor quality, Inadequate site supervision, Lack of quality assurance, Shortage of Skilled Manpower, Poor planning and scheduling, Lack of strategic planning. Five qualities, maximizing methods are High experience technical team appointment, Site management and supervision, properly structured, Experienced and skilled Contractor's staff, Staff of supervision must be skilled and experienced, High experience labor using.

**KEYWORDS:** Quality Affecting Factor, Quality Maximizing Method, Construction Project Quality



## 1 INTRODUCTION

The goal of this study is to recognize quality affecting factors of construction projects in Afghanistan. Professionals of the Construction industry containing builders, engineers, architects, and quantity surveyors were negotiated by an organized survey that recognized factors affecting the quality of construction projects from literature. Quality of construction projects affecting by many reasons like corruption, security challenges [1–5], lack of procedures and laws about construction, low capacity of governmental entities, lack of control and close monitoring, and finally these factors affected road projects, building projects, dam projects, and etc. To be implemented with a low quality. After the completion of the projects, a major part of the life cycle of the project is damaged and needs rehabilitation and this means that national treasure has been destroyed and the cooperation of the international community has been abused and the notoriety refers to the implementing bodies of the government. Afghanistan acceded development in the construction industry during the last two decades rather than previous decades. The highest role played by Private Sectors which compared to other sectors. With the decision of the United State and NATO's to extend its mission in Afghanistan outside 2016, the construction industry will experience more promotion. As construction substances are much imported from other countries, there is an opportunity for investors to produce construction material in the country. Low quality of construction projects affects negate the validity of the Afghan government, which makes a long path between people and government organization, it shows the inability of government. The comprehension validity of every factor was calculated and evaluated for all the experts' responses to the factors. Putting the relative rank and importance index compromise of entire factors which have given responses through entire professionals, the quality affecting factors of construction projects was recognized. The outcomes of this investigation cater to feedback for participants of the construction industry and serve as a bedrock for suitable quality management strategies which developing through researchers, not merely in Afghanistan, However, also for other countries that developing and have equivalent values and culture of the construction industry. Modality or quality has become a more common issue in recent years because of imaginary manipulates in the industry. Construction project quality is the result of an outcome of all activates which are doing or have done in a project, On the other hand, the temper of that result is not insured [6–10]. There are some universal tendencies are there for 'quality to be synonymously used in good quality, In addition, that is actually a hypothesis. The good quality is achieving to construction, as exactly endeavors, take careful monitoring, takes effort & time for the whole projects, to warrant the result of perspective qualities are the mean that which was predestinated [11–15], However, The result of high quality is much important for such reasons, so it is not actually for a sense that completed the project by an extra unteachable things that the complex of separate from equivalent projects. It is important due to through start to end, the handling of quality may improve each aspect of a task, through the attribute obtained by the operators, preoccupied, with all activates in the finished construction of the project. The purpose of the project quality concept is to guarantee the quality of the deliverable items of the project so that the project can deliver its created deliverable items. Project quality is measured by the general characteristics and intrinsic characteristics of project deliverables as defined by the project recipient (user, customer, consumer, etc.). If project deliverables are created without considering the defined quality, then these deliverables may not be able to meet the project acceptance criteria and as a result the project will not be delivered. Failure to realize the quality of the project will cause the project to fail [16–19]. Quality in construction projects might be determined as the achievement of plausible measures to carry out construction proceedings. This implementation should be achieved whenever the activity exceeds or meets the demand of the owner or client. The quality of each service or product is obtained whenever it accepts the desired specifications, Furthermore, Obtaining quality in construction projects since the long-range has been a problem and tough subject. Tam & Chan,

Introduced that the commonly understood factors that the influx performance quality may be categorized below the titles of project team leaders, owner, the environment of the project, actions of project management, and procedures of the project. Quality is grown an utmost general subject in current years because imaginary manipulates in the construction projects, In the other word, suitable system and quality both are subjects that have been taking enhancing consideration worldwide (Tam & Chan). The products which have elapsed in each industry to be produced to a required yardstick, one that value for money is provides satisfaction to the customer and the demand for obtaining quality of the elapsed product and any other industry is no more than building the construction industry, Furthermore, different efforts have been constructed through various investigators to illustrate the important factors of quality in industry of building construction.

## 2. LITERATURE REVIEW

[1-2], have studied construction projects quality affecting factors in Ghaza line, The utmost important affecting factors were recognized as (1) Site layout characteristics, (2) Site staff experience, (3) Design documents, consistency, (4) Contractor's financial power, (5) Construction materials availability, (6) 'Subcontractors', (7) Environment for political, (8) Using Controlling systems . [3] Conducted research in India, study shows that important quality performance affecting factors from 55 construction project properties were collected, However, out of these 55 properties point to as prosperity properties in the study were figured out to help get the demand & required quality, whilst in the attendance of 22 point to as defeat properties were figured out to effect adversely into achievement of the demand & required quality. [4] Studied indicate in Gaza Strip, The utmost effectible affecting factors of project performance as: (1) Delays due to materials shortages through road closure, (2) Resource unavailability, (3) Low-level skills of project leadership, (4) Prices of material escalation, (5) Shortage of qualified personnel and highly experienced, (6) Raw materials and available equipment with low quality . [5] Surveyed carried out regarding construction projects' quality affecting factors, the data collected for analysis through using a questionnaire with consultant, contractors and client and analysis carried out with SPSS and average index and discovered the 5 most common factors out of 18 factors are rated and recommended. (1) Negligible workmanship, (2) Specification Changes, (3) Difficulties of finance, (4) Shortage of drawing details, (5) Design change, however, suggested that effective management be accepted to improve the quality and decrease variations of the projects and changes in specification and design be minimized. [6] Studied have shown the importance of affecting factors in Nigeria about construction quality, a survey sent to experts of construction projects that contain engineers, architects, contractors, and quantity surveyors. Data analysis includes rank comparison, percentage rank agreement, one simple t-test to determine each factor's significance and correlation analysis, Finally, the result shows that the 5 utmost critical affecting factors are: (1) Delivered materials to site with down quality, (2) Experienced and skilled of labor with down level, (3) Down testing and inspection, (4) Weak procedure of site installation, (5) Quality assurance shortages. [7] Studied indicate in India, the data collected from engineers and site supervisors and analyzed through SPSS and in the result identified the seven utmost affecting and influencing factors of construction quality as (1) Labors, (2) Risks, (3) Resources, (4) Experience and standards, (5) Interaction and communication, (6) Monitoring and inspection, (7) Inventory and payment . [8] Studied indicate in Swaziland that quality affecting factors of construction projects. Data obtained through the use of a questionnaire which distributed to architects, contractors, quality surveyors, construction managers, and engineers as well as project and after analysis result shows the most quality performance affecting factors of construction projects in the study area are: Incompetent and unskilled contractors, Down supervision of the site, shortage of communication, Down scheduling and planning, Lack of Knowledge, Skill, and tanning of construction workmen, On the other hand, studied to improve quality of construction projects and minimize the impact of these factors and must use

modern and proper construction equipment's, methods, and techniques must be accepted by construction companies, Moreover, should be suitable supervision and site management . [9] Concluded that quality affecting factors of reinforced concrete building projects. Data collected through a survey and the respondents were contractors and consultants. A Cronbach's alpha ( $\alpha$ ) test was performed by using SPSS and minimum acceptable value of ( $\alpha$ ) Alpha was from 0.5 to 0.6, thus, the result shows the same for consultants and contractors on the quality affecting factors of reinforcement buildings projects, they are: Less supervision of construction, less coordination between key stakeholders, Inadequate design code of practice, Theft materials of construction, Use of unregistered consultants, Down quality construction materials, Late payment, Shortage of construction technology, Use of unregistered contractors, Less experienced and skilled staff and deficiency in design.

### 3. METHODOLOGY

A questionnaire was prepared in three different sections to distinguish the comprehension of contractors, client, consultant, and manager on the relative significance factors affecting quality with its maximizing construction quality methods in the construction industry in Afghanistan.

The survey has three sections. The first section included the demography of the respondents. The second section of the survey contained quality affecting factors of the construction project, which had 25 affecting factors that taken from the literature review and approved through university professors. The following factors were related to affecting quality construction projects.

Poor workmanship, Change in specifications by the owner, Inadequate working drawing details, Changes in Design, Lack of strategic planning, Owner's financial problems, Change in scope of the project, Shortage of skilled manpower, Inadequate design, Unavailability of equipment's, Insignificant scheduling and planning, Shortage of communication, Project manager's ignorance and shortage of knowledge, Poor material and plant management, Inadequate site supervision, Contractors' insignificant technical knowledge, shortage of quality assurance, Insignificant inspection and testing, Defects of design, Material delivered to site with down quality, Insignificant reports, and record-keeping, Effect of code and standards on quality, Poor weather conditions, Security challenge during the implementation of projects and Corruption during the implementation of projects.

The third section of the questionnaire includes the maximizing methods of quality of construction project in construction industry taken from a literature review, these maximizing methods are 24 which shown following.

Use proper and modern construction equipment, Project duration with adequate allocation, Using reasonable construction methods for a special project, Appropriate supervision and site management, Standard specification and construction drawing, Appropriate construction team coordination, Proper and complete design at the right time, Suitable and up-to-date project scheduling and planning, Impressive strategic planning, Have high technical and experienced team, Proper project feasibility study, Project environment, Strict quality assurance control, Applicable standard norms and design at the national level, the Management system of labors, High experience of labor, Supervision team must know contract administration, Experienced and skilled supervision staff, Experienced and skilled contractor's staff, Full details of drawing are prepared, Following standards and codes, Detailed and accurate bill of quantity, Using a standard contract and operating a comprehensive material management system.

A five-point Likert Scale from strongly disagree (1) to strongly agree (5) was accepted to gain the significance of respondents about factors affecting and maximizing methods of quality. The sampling method used in this research has been the Snowball sampling method comes under the category of non-

probability sampling techniques. This method made it easy to gain responses from professional respondents from a public and private organization, with the help of friends which saved time and money. 100 sets of questionnaires were prepared for data collection, 21 sets of questionnaires were answered by respondents in a face-to-face interview and 79 sets were sent via email. From 79 sets, we received only 65 sets of responses distributed to professional respondents in the construction field. So totally received 86 sets of responses.

### 3.1. Data Analysis

Respondents Demographic are Given in Table-1

<b>Table 1 : Respondents Demographic</b>			
<b>Age</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cumulative %</b>
25-30	40	46.51	46.51
30-35	31	36.05	82.56
35-45	7	8.14	90.70
45-50	5	5.81	96.51
Above 50	3	3.49	100.00
<b>Education</b>			
Graduate	64	74.42	74.42
Post Graduate	22	25.58	100.00
<b>Designation</b>			
Manager	27	31.40	31.4
Engineer / Consultant	44	51.16	82.56
Client / Owner	6	6.98	89.54
Contractor	9	10.47	100.00
<b>Experience</b>			
1-5 years	28	32.56	32.56
6-10 years	41	47.67	80.23
11-15 years	11	12.79	93.03
More than 15 years	6	6.98	100.00
<b>Types of Projects Experienced</b>			
School	23	26.74	26.74
Hospital	10	11.63	38.37
Public Facilities	47	54.65	93.02
Housing Estate	6	6.98	100.00

### 3.2. Calculation of Relative Importance of Factors

The collected data were analyzed based on clients, contractors, consultants, and manager's point of view and Relative Importance Index,  $RII = \frac{\sum W}{A*N}$ , where A is the highest weight (5 in this case), W is the weighting given to every factor by respondents (limiting from 1 to 5) and N is the total number of respondents. Relative Importance Index was analyzed with the help of Excel and SPSS for every factor which affects construction projects are listed in table 2. According to the RII, the 10 utmost significant factors affect the quality of construction projects in Afghanistan. They are, Corruption during the implementation of projects, Security challenge during the implementation of projects, Poor inspection and testing, Contractors' poor technical knowledge, and Material delivered to site with down quality. Corruption in the governmental organization is also an extremely big issue affecting the quality in the inspection of projects' works finally effect projects to get down quality than required quality.

Table-2: Relative Importance Index &amp; rank of quality affecting factors of construction projects

	Point view of Respondents	percentage of respondents scoring					RII	Rank
		5	4	3	2	1		
Factors most likely affecting Project Quality	Poor workmanship	21	45	12	5	3	0.777	11
	Change in specifications by the owner	10	28	25	16	7	0.642	24
	Inadequate working drawing details	15	34	16	14	7	0.684	20
	Changes in Design	15	24	19	24	4	0.651	22
	Lack of strategic planning	30	34	9	9	4	0.779	10
	Owner's financial problems	28	30	16	9	3	0.765	14
	Change in scope of the project	10	31	20	20	5	0.649	23
	Shortage of Skilled Manpower	31	34	9	10	2	0.791	8
	Inadequate design	6	47	20	10	3	0.700	17
	Unavailability of equipment's	27	28	13	12	6	0.735	15
	Poor planning and scheduling	29	38	7	8	4	0.786	9
	Lack of communication	11	36	22	14	3	0.688	19
	Project Manager's ignorance and lack of knowledge	24	39	13	7	3	0.772	13
	Poor material and plant management	30	32	13	6	5	0.777	11
	Inadequate site supervision	20	50	12	3	1	0.798	6
	Little technical knowledge of Contractors	27	44	10	3	2	0.812	4
	Lack of quality assurance	30	34	13	7	2	0.793	7
	Negligible testing and inspection	32	38	11	5	0	0.826	3
	Defects of design	11	35	29	7	4	0.698	18
	Material delivered to site with down quality	30	39	11	3	3	0.809	5
	Insignificant record-keeping and report	14	36	26	8	2	0.721	16
	Effect of standards & code on quality	12	30	24	16	4	0.670	21
	Poor weather conditions	9	25	31	15	6	0.637	25
Security challenge during the implementation of projects	37	36	9	2	2	0.842	2	
Corruption during implementation of projects	53	22	6	1	4	0.877	1	

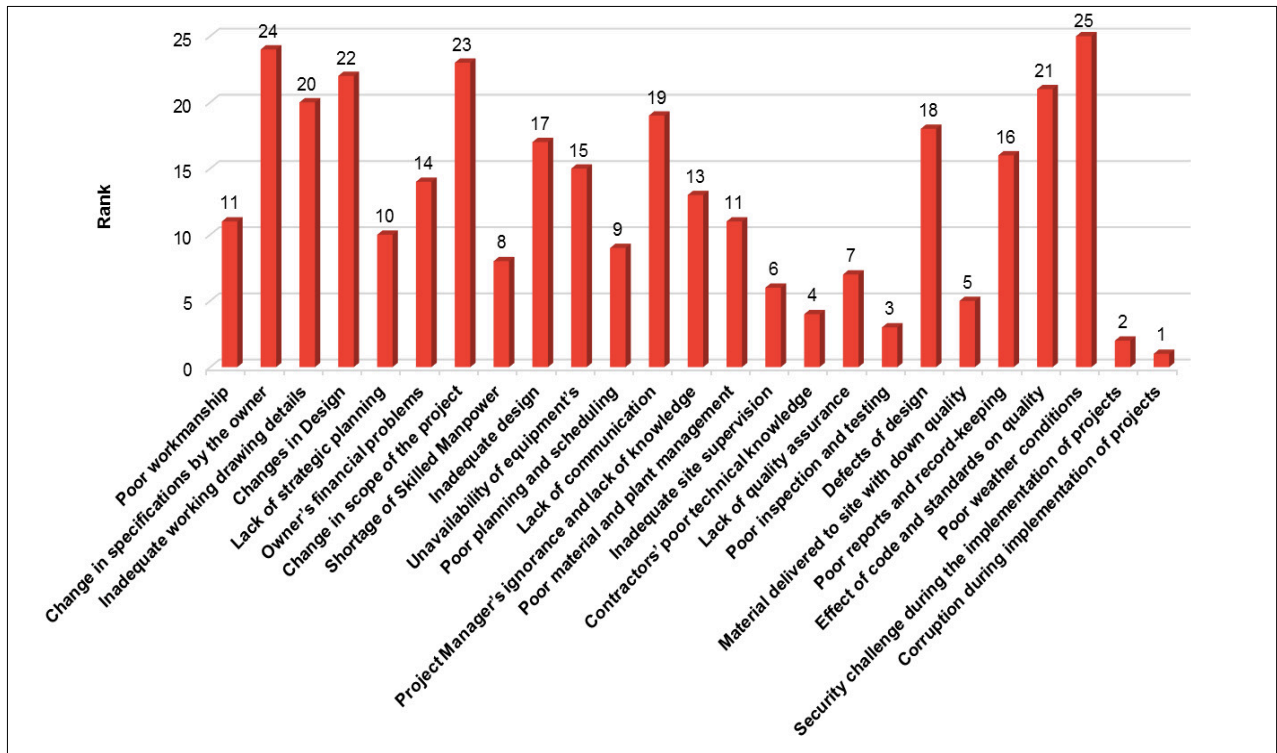


Figure 1: Show quality affecting factors ranks of construction projects.

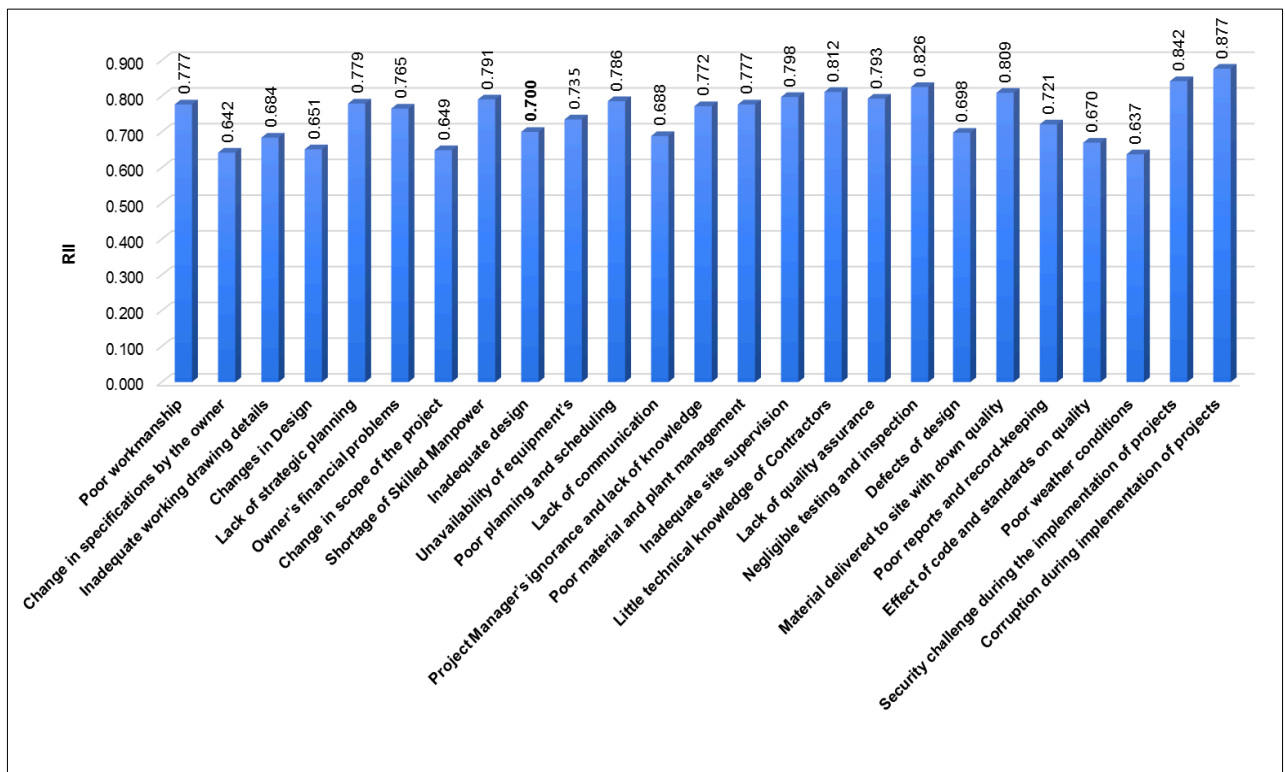
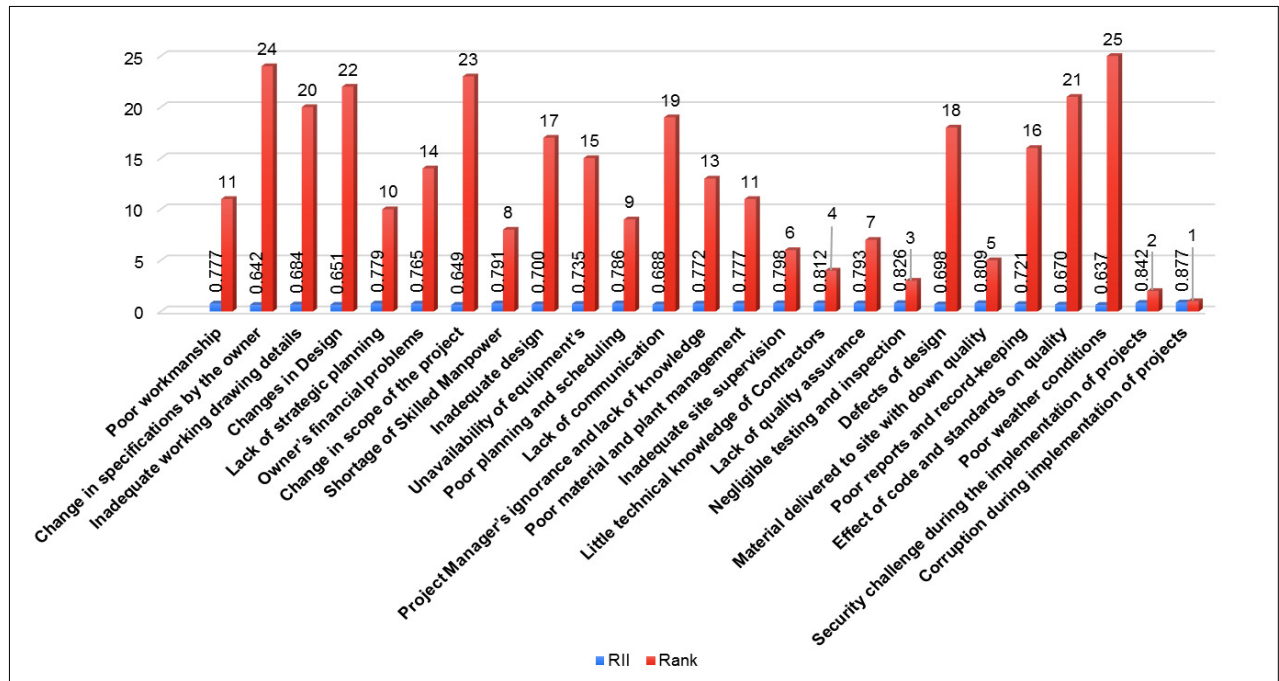


Figure 2: Relative Importance Indexes of quality affecting factors are given.



**Figure 3: Relative Importance Index & Ranking of quality affecting factors of construction projects are given.**

3.3. Maximizing methods of construction project quality.

Based on the analyzed of collected data from respondents; the researcher identified top five maximizing methods that help to eradicate the seriousness of critical factor’s impacts on project operation. The Ranking order & Relative Importance Index of the methods are included in the Table 3 and figure 1 to 6.

**Table 3: Maximizing methods of construction project quality in outskirts areas of Afghanistan**

Maximize methods of construction projects quality	Point of Respondents	percentage of respondents scoring					RII	Rank
		5	4	3	2	1		
	Use proper and modern construction equipment	24	46	10	4	2	0.800	7
	Project duration with adequate allocation	16	42	23	4	1	0.758	20
	Using reasonable construction methods for special project	26	38	12	10	0	0.786	15
	Appropriate supervision and site management	38	35	5	6	2	0.835	2
	Standard specification and construction drawing	26	42	11	4	3	0.795	11
	Appropriate construction team coordination	32	34	10	7	3	0.798	10
	Proper and complete design at the right time	26	33	17	10	0	0.774	18



Suitable and up-to-date project scheduling and planning	31	36	9	9	1	0.802	6
Impressive strategic planning	26	35	15	7	3	0.772	19
Have high technical and experienced team	38	36	6	2	4	0.837	1
Proper project feasibility study	27	38	15	3	3	0.793	12
Project environment	13	35	23	12	3	0.700	24
Strict quality assurance control	26	40	13	4	3	0.791	13
Applicable standard norms and design at the national level	22	38	20	6	0	0.777	17
Labor management system	24	43	11	5	3	0.786	15
Using labor with high experience	29	38	13	4	2	0.805	5
Supervision team must know contract administration	15	44	16	7	4	0.737	22
Experienced and skilled supervision staff	34	33	11	5	3	0.809	3
Experienced and skilled contractor's staff	33	35	10	5	3	0.809	3
Full details of drawing are prepared	26	41	14	3	2	0.800	7
Conformance to codes and standards	17	41	16	9	3	0.740	21
Bill of quantity is detailed and accurate	30	33	13	9	1	0.791	13
Using a standard contract	20	33	21	8	4	0.733	23
Using a comprehensive material management system	31	34	12	8	1	0.800	7

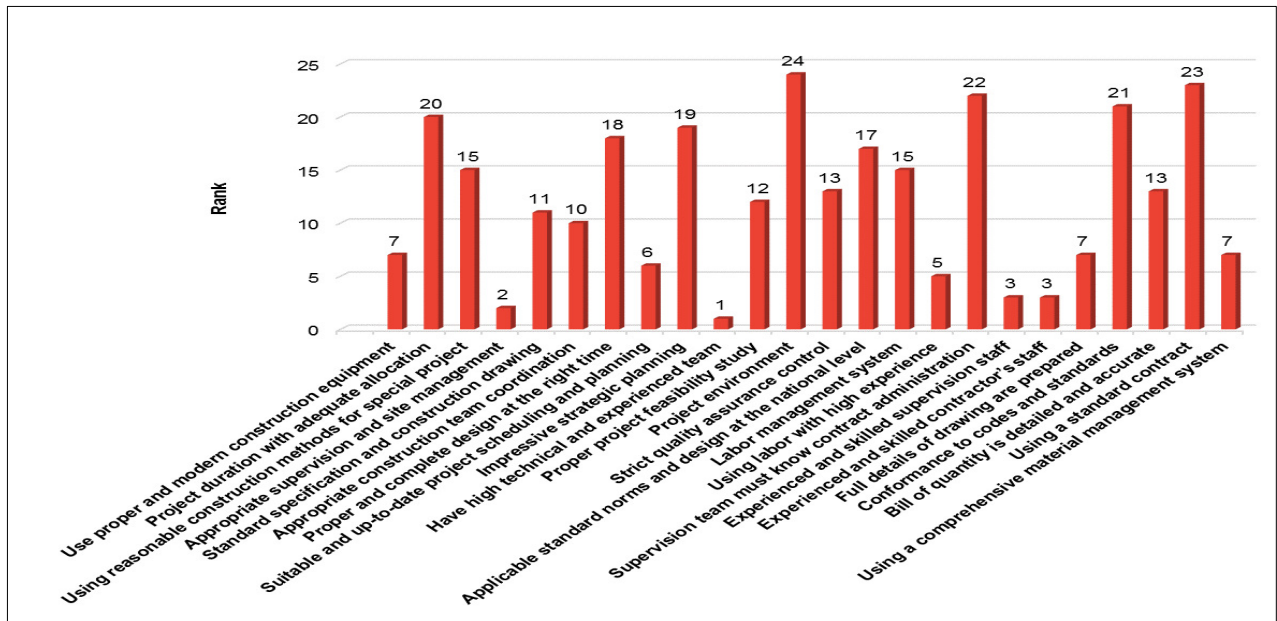


Figure 4: Show rank maximizing methods that will improve quality of construction projects

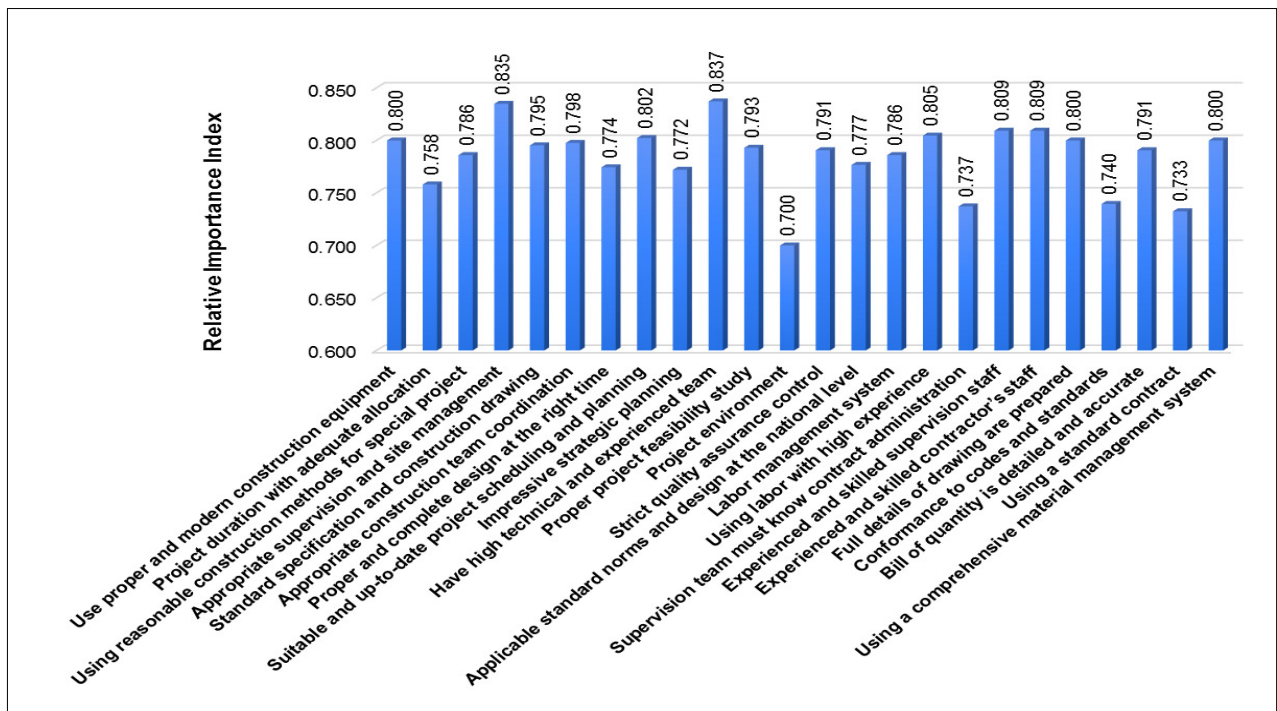


Figure 5: Show relative importance index of maximizing methods which will improve quality of construction projects

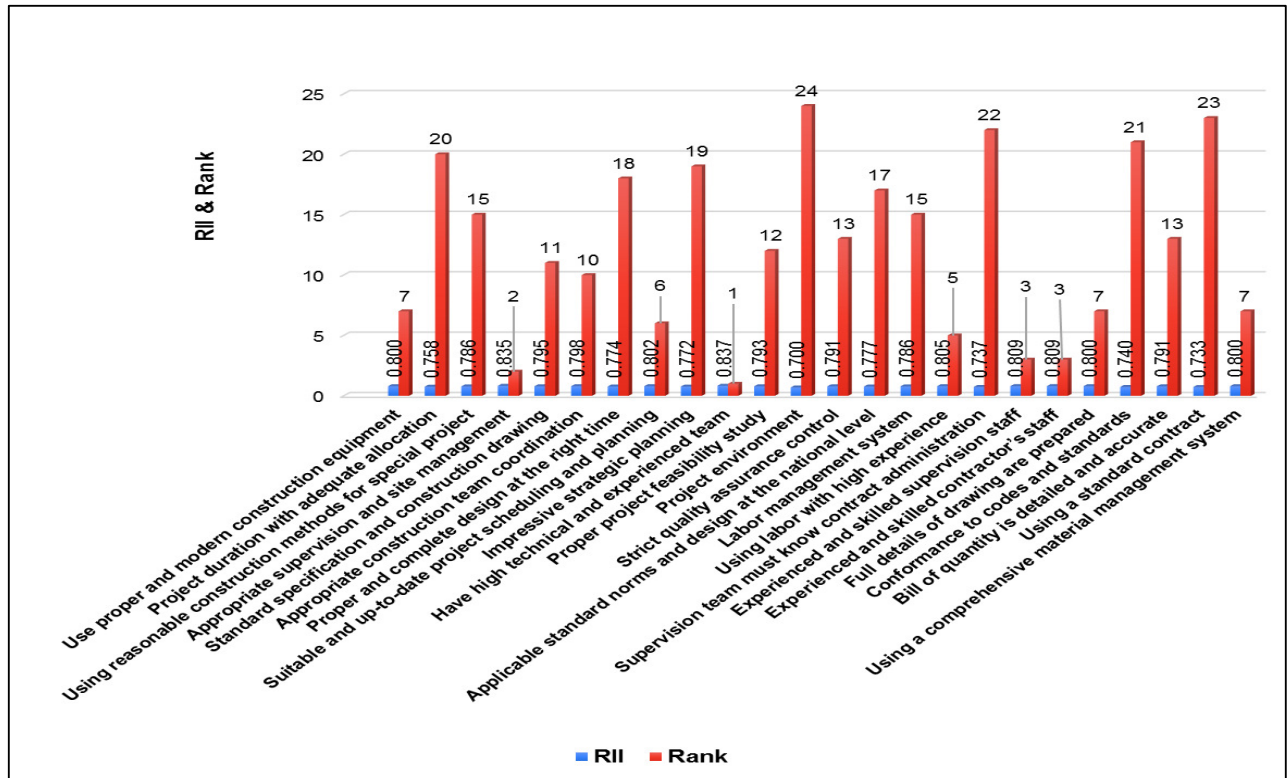


Figure 6: Show relative impotence index and rank of maximizing methods.

4. DISCUSSIONS OF RESULTS

Factors deduced from data analysis are illustrated in this section, first affecting factors, and second we remark the maximizing methods of quality.

Top ten most significant quality affecting factors according to all respondents overview as included in table-2 are (1) Corruption during the implementation of projects with RII = 1.047, (2) Security challenge during the implementation of projects with RII = 1.006, (3) Negligible testing and inspection with RII = 0.986, (4) Little technical knowledge of Contractors with RII = 0.969, (5) Material delivered to site with poor quality with RII = 0.967, (6) Inadequate site supervision with RII = 0.953, (7) Lack of quality assurance with RII = 0.947, (8) Shortage of skilled manpower with RII = 0.944, (9) Poor planning and scheduling with RII = 0.939, (10) Lack of strategic planning with RII = 0.931.

4.1. *Corruption:* Afghanistan's ranking in corruption is 177th out of 180 countries, according to corruption perception INDEX 2017 reported by Transparency International under this rank and analyzed a survey of respondents to research shows that Afghanistan governmental administration deepened corruption. Corruption causes a development project to be delayed from its scheduled time.

4.2. *Security Challenge during Implementation of Project:* The Safe and security rank of Afghanistan is 166th out of 167 according to Legatum and Prosperity Index TM. In accordance with this rank and survey was done in this research, insecurity critically challenges the projects to be performed within scheduled time and budget, despite, Afghan government with the US and NATO's member countries try hard to prepare welfare and secured environment.

*4.3. Low-Quality Materials:* Afghanistan suffered four decades' war, this war has devastated development plans, industrializing plans, manufacturing plans, and patriot people who were to extensively implement these plans. That is the reason today we import low-quality material from regional countries, besides this, there is no standard assessment agency to scan all materials. Low-quality materials imported and affected controversy in project completion

*4.4. Little technical knowledge of Contractors:* Technical and mechanical knowledge of contractor advancement, improve collaboration and prevent the complexity of construction projects. It allows us to escalate productivity. With the help of knowledge, a taller, stronger, and efficient structure can be built. Lack of technical knowledge of the contractor might consume more time for the building of any special task in construction projects, Contractors most of the time face problems due to shortage of knowledge in conclusion it affects the quality of construction projects.

*4.5. Negligible testing and inspection:* Construction projects require huge testing and inspection during the implementation of construction projects. That is the reason today not conducting suitable testing and inspection in a construction project the outskirts area of Afghanistan is so affecting the quality.

*4.6. Inadequate site supervision:* Most time construction projects need site supervision to accurately adjustment doing activates according to desirable design and specification and guide site staff to their problems, besides, give a report to manager on time, but rural construction projects in Afghanistan face with the shortage of site supervision so has affected the quality of construction projects.

*4.7. Lack of quality assurance:* Quality assurance is most important to each project and it is performed before starting of construction projects, in the other word, quality assurance is the process that handles the quality of projects, quality assurance has a specific list of standards, norms, policies, and processes to easily control the circumstance or state of construction projects that have to be carried out before implementation of projects, but unfortunately in outskirts areas of Afghanistan does not care regarding quality assurance so affecting the quality of construction projects.

*4.8. Shortage of skilled manpower:* The hiring of experienced, skilled manpower can be effective on project execution, where skilled manpower in the project makes a blueprint which conducting whole the project activates based on specification and norm and have ability to perform each activity on time and with a certain quality, Notwithstanding, rural areas of Afghanistan face a shortage of skilled manpower may affect the quality of construction projects.

*4.9. Poor planning and scheduling:* Planning and scheduling are much important at the right time drives forward projects to work into the completion point. Project planning and scheduling is provided through the project team and it is a chart which the project team will refer during the execution of the project, Moreover, the project planning and scheduling are manual for achieving set objectives of the project, but in outskirts areas of Afghanistan not have been suitable project planning and scheduling, due to, affecting the quality of construction projects.

*4.10. Lack of strategic planning:* Strategic planning is critically significant to define the direction of your construction project. Well thought of a strategic plan is focused on stakeholders and the project team toward objective and strategic planning assure efficient delivery of construction projects with all standard within the time, but for outskirts areas of Afghanistan not exist proper strategic planning, So, affecting the quality of construction projects.

## 5. MAXIMIZING METHODS TO IMPROVE QUALITY OF CONSTRUCTION PROJECTS:

Top five maximizing methods which deduced from questionnaire analysis shown in table 3 are (1) High experience technical team appointment with RII = 1.00, (2) Site management and supervision, proper structured with RII = 0.799, (3) Experienced and skilled Contractor's staff with RII = 0.967, (3) Staff of supervision must be skilled and experienced With RII = 0.967, (5) High experience labor using with RII = 0.961. Described in this section to prevent construction projects in outskirts areas of Afghanistan from down quality.

*5.1. Have high technical and experienced team:* Selecting of high technical, and experience a team can be effective on project performance, where high technical, and experience team in the project makes blueprint which conducts entire project from ideation to fruition, specifying project scope, resources, time frame, communication strategy between parties and maximize the quality of construction projects.

*5.2. Site management and supervision, proper structured:* Site management and supervision have an important role in the success and development of a construction project, it involves managing projects, bridges, roads, and industrial facilities. Construction managers should supervise resources, including equipment, materials, workforce, and budget. They should set up coordination with workers, consultants/Engineers, contractors, subcontractors to tackle the quality of projects.

*5.3. Experienced and skilled Contractor's staff:* Engaging of experience and skilled contractor's staff would be effective and helpful to project execution, where experience and skilled contractor's staff can doing best and desirable works based on a signed contract which has required high quality and completion on time and might maximize the quality of construction projects in outskirts areas of Afghanistan.

*5.4 Staff of supervision must be skilled and experienced:* Giving and selecting skilled and experienced supervisory staff can be effective in project implementation, which experience and skill staff supervision may be controlling the whole project activates according to standard and norm and will complete the projects based on a certain time and maximize the quality of construction projects.

*5.5. High experience labor using:* Choosing of high experience labor will be impressed with a project the fulfillment that high experience labors able to catch easily engineer instruction and such activities will be performed with the best quality and arrange materials as well, thus, high experience laborers maximize the quality of construction projects.

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